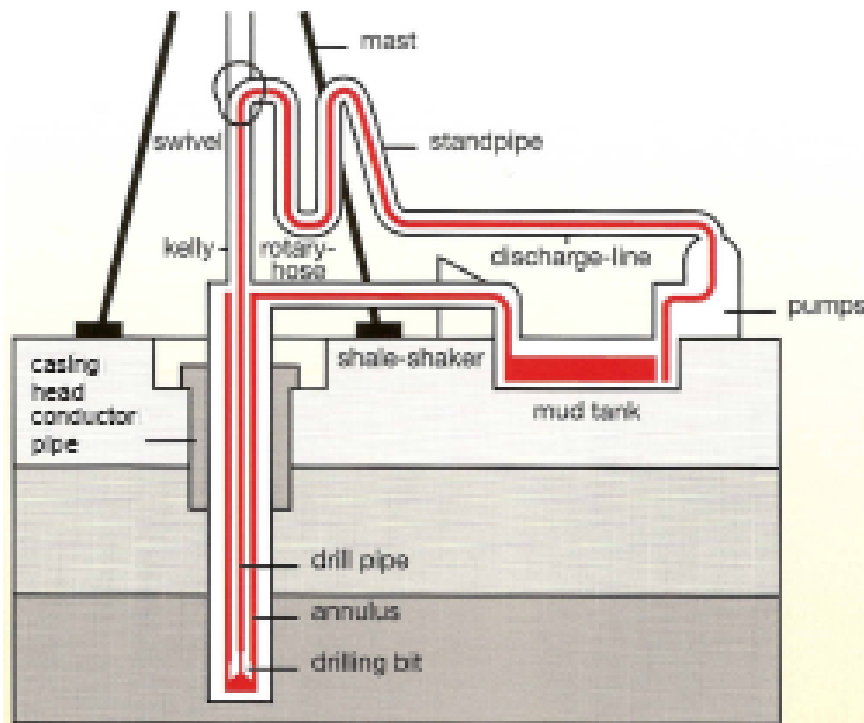


ANTISOL™ FL Polyanionic Cellulose
 Drilling Fluids Product Range

**Water Base
 Drilling Fluids**

In order to understand the use of products to overcome problems encountered in deep well drilling, it is necessary to appreciate the function and properties of drilling fluids. These are essential parts of the rotary drilling system. Basically, these fluids insure a high rate of penetration and a good bore hole stability. The fluid is pumped down the drill pipe and returns to the surface via the annulus loaded with solids. Rock particles and other solid or semisolid matters are removed by sieves and centrifuges. Then the drilling fluid is pumped back to the holding tank for recirculation. This is the method that is preferred in deep well drilling. Originally water alone was used but it was soon observed that the clay picked up during drilling gave muds with better flow properties and a higher debris carrying capacity. However, these properties varied tremendously according to the geological structure making control of the mud almost impossible. This type of mud was also very susceptible to contamination and precipitation by salts from the drilling strata, necessitating the use of excessive quantities of mud and adjustment of properties. To overcome the disadvantages of these random clay and water systems special polymer containing suspensions were developed. It can be stated that with the use of polymers – like ANTISOL FL Polyanionic Cellulose - the properties of drilling fluids can be adapted to the highly differing demands resulting from the formation encountered during drilling.

**Drilling for Oil
 and Gas**



Composition of Water Based Drilling Fluids

Water based drilling fluids can be formulated either with or without clay. For the reduction of fluid loss, clay constitutes an essential basis for drilling fluids. Polymers are needed to adjust predetermined, specified values resulting from the formation. These polymers perform the following essential functions:

- An effective clay dispersion particle as a result of the polymer adsorption on the surface of the clay platelets. Thus more favourable values with respect to fluid loss are achieved.
- A protection of the clay platelets against the detrimental effects of electrolytes.
- A "free" water retention of the drilling fluid which could penetrate into the formation.
- Shale inhibition that prevents the swelling of shale formations and the dispersion of the shale in the drilling fluid.

For special uses other chemicals can be added to the drilling fluid system based on water, clay and polymers. These products can be, for example, thinners, lubricants, defoamers, etc.

Functions of Drilling Fluids

Drilling fluids have the following essential functions:

- removal of cuttings
- stabilization of the bore hole
- cooling and lubrication
- control of formation pressure

These requirements can be responded by drilling fluids formulated thanks to polymers with suspension capability (i.e. viscosification), filtrate loss control to the formation, clay stabilization, and lubrication.

PAC versus CMC polymer

Sodium carboxymethyl cellulose (CMC) is an unpurified anionic polymer containing up to 40% salts (sodium chloride and sodium glycolate) which has been discovered to answer the above needs. Unfortunately nowadays, industry requirements have shown that the ordinary CMC polymer has limitations in salt solutions which lead the drilling industry to call for a specifically designed polymer, the polyanionic cellulose (PAC).

Dow Wolff Cellulosics has been leveraging its manufacturing expertise in serving the highly demanding regulated markets, such a food, pharmaceuticals and dental care, to offer the premium PAC grades ANTISOL™ FL Polymers. These viscosify high electrolyte containing systems besides having outstanding filtration reduction and clay stabilising properties.

They are a very versatile additive for various applications; the range of use concentration is consequently broad, from 0.2 to 5 lb/bbl (0.6 to 14 kg/m³).

The medium viscosity grade ANTISOL FL100 is used in common solids content muds. The low viscosity grades ANTISOL FL30 and FL10 are used to reduce fluid loss in heavily weighted muds, where commonly xanthan polymers are used as suspending agents.

Product Range for Drilling Fluids

Type	Active content (min %) ¹	Brookfield viscosity LVT / 25°C (mPa.s)	Concentration of solution for viscosity (%)
Polyanionic Cellulose			
ANTISOL™ FL 30 000	98	Min 2500	1
ANTISOL FL 100	98	80 – 160	2
ANTISOL FL 30	98	20 – 60	2

They are not to be considered product specifications

1. Not covering the humidity as packaged.

Product Properties

ANTISOL FL 30 000	Extremely high viscosity	<ul style="list-style-type: none">• A fluid loss agent with a very high yield• An excellent viscosifier• With shale inhibiting properties
ANTISOL FL 100	Low viscosity	<ul style="list-style-type: none">• A fluid loss agent with a good yield and also extremely good rheological properties for low filtrate values
ANTISOL FL 30	Ultra Low Viscosity (ULV)	<ul style="list-style-type: none">• A fluid loss agent for extremely low filtration values• No disturbing increase in viscosity

Shipping Data, Storage and Handling

ANTISOL™ FL PAC Polymer is shipped in 25-kg paper bags, palletized to 750 kg (30 bags) or 1000 kg (40 bags) for 20-foot container shipments of respectively 15 or 10 tones. When the product is handled in a closed system, the possibility exists that the concentration of dust could build up to such a degree that a dust explosion could occur. This fact should be considered in designing handling systems, such as bulk storage bins, pneumatic conveyors, and the like. In open handling systems, this hazard is negligible.

Product Stewardship

Dow encourages its customers and potential users of the Dow Oil & Gas products and materials to review their applications from the standpoint of human health and environmental aspects. To help ensure that it is not used in ways for which it is not intended or tested, Dow personnel will assist customers in dealing with environmental and product safety considerations. Dow literature, including Safety Data Sheets, should be consulted prior to the use of the Dow Oil & Gas products and materials. Please refer to the resources on the website www.dow.com or contact the Online Technical Support thereon.

Obtaining a Sample

For literature or samples, feel free to call our Customer Information Group:

Europe	toll free number:	+800 3 694 6367 †		
	telephone:	+32 3 450 2240	fax:	+32 3 450 2815
North America	toll free number:	800 447 4369		
	phone:	+1 989 832 1556	fax:	+1 989 832 1465
Latin America	phone:	+55 11 5188 9222	fax:	+55 11 5188 9749
Asia-Pacific	toll free phone	+500 7776 7776*		
	phone:	+60 3 7958 3392	fax:	+60 7958 5598
Email to:		dowcig@dow.com		

† International toll free from Austria, Belgium, Denmark, Finland (prefix 990), France, Germany, Hungary, Ireland, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

* Toll free service not available in all countries

Complementary Product Offering

To serve your oil field needs, Dow Oil & Gas also offers other polymers such as CELLOSIZETM HEC.

Also broad spectrums of chemicals and materials for drilling, stimulation and cementing operations, for use in oil and gas production and to enhance oil recovery are available. Please refer to the corresponding technical application sheets.

Contact information goes here:

North America: 1-800-477-4369

Europe: (+32) 3-450-2240

Asia/Pacific: (+852) 2879 7339

Other areas: 1-989-832-1556

[http:// www.dowoilandgas.com](http://www.dowoilandgas.com)

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